

## Claims

- [c1] 1.A method for forming an elongated fused quartz article comprising the steps of:
- a)feeding a generally quartz ( $\text{SiO}_2$ ) material into a furnace;
  - b)fusing the quartz ( $\text{SiO}_2$ ) material in a melting zone of the furnace under a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas;
  - c)drawing the article from the furnace; and
  - d)optionally, baking the article in a gas atmosphere comprising a deuterium gas.
- [c2] 2.The method of claim 1 further comprising the step of heat treating the article drawn from the furnace in a substantially hydrogen-free gas atmosphere or vacuum.
- [c3] 3.The method of claim 1 wherein the gas atmosphere of steps b) or d) further comprises an inert gas or a mixture of inert gases.
- [c4] 4.The method of claim 3 wherein the  $\text{D}_2$  gas and inert gas or mixture of inert gases are present in a volume ratio of about 20%  $\text{D}_2$  and about 10% inert gas or mixture of inert gases.
- [c5] 5.The method of claim 3 wherein the  $\text{D}_2$  gas and inert gas or mixture of inert gases are present in a volume ratio of about 90%  $\text{D}_2$  and about 10% inert gas or mixture of inert gases.
- [c6] 6.The method of claim 3 wherein the dew point of the gas atmosphere of step b) is about  $-30^\circ\text{C}$ . to about  $80^\circ\text{C}$ .
- [c7] 7.The method of claim 3 wherein the dew point of the gas atmosphere of step b) is about  $-20^\circ\text{C}$ . to about  $10^\circ\text{C}$ .
- [c8] 8.The method of claim 1 being a continuous process.
- [c9] 9.The method of claim 1 wherein the article is a deposition tube.
- [c10] 10.The method of claim 1 wherein the article is a sleeve tube.

- [c11] 11.The method of claim 9 wherein the deposition tube has a hydrogen content of about  $5 \times 10^{-11}$  mol/g to about  $5 \times 10^{-8}$  mol/g.
- [c12] 12.The method of claim 1 wherein the baking is carried out at a temperature of about 200 ° C. to about 1500 ° C.
- [c13] 13.A method for forming an elongated fused quartz article comprising the steps of:
- a)pretreating a generally quartz ( $\text{SiO}_2$ ) material in a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas;
  - b)feeding the pretreated quartz ( $\text{SiO}_2$ ) material into a furnace;
  - c)fusing the pretreated quartz ( $\text{SiO}_2$ ) material in a melting zone of the furnace under a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas or a substantially hydrogen-free gas;
  - d)drawing the fused  $\text{SiO}_2$  material article from the furnace to form the article;
- and
- e)heat treating the drawn article in a substantially hydrogen-free gas atmosphere or vacuum.
- [c14] 14.The method of claim 13 being a continuous process.
- [c15] 15.The method of claim 13 wherein the article is a deposition tube.
- [c16] 16.The method of claim 13 wherein the article is a sleeve tube.
- [c17] 17.The method of claim 13 further comprising the step of :
- e)baking the fused  $\text{SiO}_2$  article in a gas atmosphere comprising a deuterium gas.
- [c18] 18.A method for forming a fused quartz article comprising the steps of:
- a)providing a generally quartz ( $\text{SiO}_2$ ) material; and
  - b)fusing the quartz ( $\text{SiO}_2$ ) material in a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas to form the quartz article.
- [c19] 19.The method of claim 18 wherein the gas atmosphere further comprises an inert gas or a mixture of inert gases.

- [c20] 20.The method of claim 18 further comprising the step of:  
c)heat treating the fused SiO<sub>2</sub> article in a substantially hydrogen-free gas atmosphere.
- [c21] 21.The method of claim 20 wherein the heat treating is carried out at about 200 ° C. to about 1500 ° C.
- [c22] 22.The method of claim 18 wherein the article is a deposition tube.
- [c23] The method of claim 18 wherein the article is a sleeve tube.